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527 CMR: BOARD OF FIRE PREVENTION REGULATIONS

527 CMR 14.00: FLAMMABLE AND COMBUSTIBLE LIQUIDS, FLAMMABLE SOLIDS OR FLAMMABLE GASES

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14.01: Scope

527 CMR 14.00 shall apply to the storage and handling of flammable liquids, combustible liquids, flammable solids and flammable gases.

(2) 527 CMR 14.00 shall not apply in any instance where the use or occupancy of any building or other structure is specifically regulated by other rules and regulations of the Board of Fire Prevention Regulations.

(3) All tanks, containers, vessels and transport vehicles are to be considered full for the purpose of permitting required under 527 CMR 14.00 or licensing as required by M.G.L. c. 148, § 13.

14.02: Definitions

For the purpose of 527 CMR 14.00, the following terms shall have the meanings respectively assigned to them:

Approved: approved by the Marshal

Boiling Point: the temperature at which the vapor pressure of a liquid equals the atmospheric pressure of 14.7 pounds per square inch gauge (psig) or 760 mm of mercury. Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for purposes of this classification, the 10% of a distillation performed in accordance with ASTM D86 shall be used as the boiling point of the liquid.

Combustible Liquid: Any liquid having a flash point at or above 100°F shall be known as a Class II or Class III Liquid. Combustible liquids shall be divided into the following classifications:

Class II: Liquids having flash points at or above 100°F and below 140°F.

Class IIIA: Liquids having a flash point at or above 140°F and below 200°F.

Class IIIB: Liquids having a flash point at or above 200°F.

Compressed Gas: Any material or mixture having in the container an absolute pressure exceeding 40 psi at 70°F (276 kPa at 21°C) or, regardless of the pressure at 70°F (21°C), having an absolute pressure exceeding 140 psi at 130°F (965 kPa at 65°C) or any flammable material having a vapor pressure exceeding 40 psi at 100°F (176 kPa at 38°C) as determined by ASTM D323.

Flammable Compressed Gas: Either a mixture of 13% or less (by volume) with air forms a flammable mixture, or the flammable range with air is wider than 12% regardless of the lower limit. These limits shall be determined at atmospheric temperature and pressure.

Flammable Liquid: Any liquid having a flash point below 100°F and having a vapor pressure not exceeding 40 psia at 100°F Flammable liquids shall be known as Class I liquids and shall be divided into the following classifications:

Class IA: Liquids having flash points below 73°F and having a boiling point below 100°F.

14.02: continued

Class IB: Liquids having flash points below 73°F and having a boiling point at or above 100°F.
Class IC: Liquids having flash points at or above 73°F and below 100°F.

Flammable Solid: A solid substance, other than one classified as an explosive, which is liable to cause fires through friction, through absorption of moisture, through spontaneous chemical changes, or as a result of retained heat from manufacturing or processing.

Flash Point: The minimum temperature in degrees Fahrenheit at which a flammable or combustible liquid will give off sufficient vapors to form an ignitable mixture with air near the surface or in the container, but will not sustain combustion. The flash point of a liquid shall be determined by appropriate test procedure and apparatus as specified in ASTM D56 and ASTM D93.

Marshal: the State Fire Marshal.

Person: Includes a corporation, firm, partnership, association, organization and any other group acting as a unit as well as individuals. It shall also include an executor, administrator, trustee, receiver or other representative appointed according to law.

14.03: Storage

- (1) Except as otherwise provided for, no flammable or combustible liquids, flammable solids or flammable gases may be kept, stored, manufactured or sold without first obtaining a permit from the head of the fire department. The application for the permit shall clearly set forth the amounts of various flammable and combustible liquids, flammable solids or gases proposed to be kept or stored. The permit shall prescribe the conditions and specify the amounts to be kept or stored.
- (2) In accordance with the provisions of M.G.L. c. 148 § 13, the following amounts, listed in Table 1, of flammable and combustible liquids, flammable solids or flammable gases may be kept, stored, manufactured or sold without obtaining a license from the local licensing authority.

Table 1

| | |
|-------------------------|-------------------|
| Class I liquids..... | 793 gallons† |
| Class I liquids,..... | 10,000 gallons‡ |
| Class II liquids..... | 10,000 gallons |
| Class IIIA liquids..... | 10,000 gallons |
| Class IIIB liquids..... | 10,000 gallons |
| Flammable gases..... | 3,000 cubic feet |
| (within a building) | |
| Flammable gases..... | 10,000 cubic feet |
| (outside a building) | |
| Flammable solids..... | 100 pounds |

† In containers of 60 gallons capacity or less, or in portable tanks over 60 gallons capacity not intended for fixed use, including intermediate bulk containers (IBCs) designed for mechanical handling.

‡ In storage tanks having a liquid capacity that exceeds 60 gallons capacity, intended for fixed installation, and not used for processing.

Note 1. The aggregate capacities of each separate class of flammable or combustible liquids shall be used when determining permit or license thresholds.

Note 2. When storing more than one class of liquid or other materials named in Table 1, a license shall only be required for the individual class or materials, which exceed the amounts

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listed.

(3) If a license is required based on the limits set forth in Table 1, a permit shall be obtained in accordance with 527 CMR 14.03: (1).

(4) All flammable or combustible liquids, flammable solids or flammable gases for which a permit has been granted under 527 CMR 14.00 shall be kept or stored in such manner as the official granting the permit may prescribe.

(5) The head of the fire department may limit the quantity of flammable or combustible liquids, flammable solids or flammable gases that may be kept, stored, manufactured or sold under the authority of a permit to less than that specified in the foregoing table where, in his opinion, conditions are such as to warrant his restricting the amount of such fluids, solids or gases.

(6) Recognized tradesmen or artisans and those persons working under their supervision, will not be required to obtain a permit for the keeping and use of any flammable or combustible liquid or flammable gas, for use in connection with such construction or repair, in any building or structure, provided said flammable or combustible liquid or flammable gas is removed from the building or structure upon the completion of each working day, and further provided a suitable fire extinguisher of at least 1A-10B:C rating is immediately available where flammable or combustible liquids or flammable gases are being kept or used. If any flammable or combustible liquids or flammable gases are not removed from the building or structure upon completion each working day a permit shall be required in accordance with 527 CMR 14.03(1).

(7) Whenever the flammable liquid or gases are to be used by the recognized tradesmen or artisans within two feet of the combustible material, adequate measures are to be taken to prevent the ignition of the adjacent combustibles by the use of resistive material between the flame and the combustible material.

(8) Gasoline may be used, kept, or stored in any building not used for habitation nor frequented by the public, without a permit, provided the total quantity shall not exceed seven gallons and provided the gasoline is stored in one or more approved containers. Approved containers shall include those built to U.S. DOT standards, listed and labeled by a NRTL, or approved by the State Fire Marshal. When not in use, containers shall be in a secured, upright position with all openings tightly closed. Such containers shall be kept away from all heating devices and shall not be opened in any area where there is an open flame or an electric or mechanical device that might cause a spark. If a container is used in an enclosed area, such area shall be suitably ventilated.

(9) All tanks, equipment, and apparatus and all piping, fittings and appliances used or intended to be used for the storage, handling, use or movement of flammable or combustible liquids shall be constructed, tested and approved in accordance with provisions of 527 CMR 9.00.

(a) Above ground tanks for the storage of flammable and combustible liquids shall comply with the provisions of 527 CMR 9.00 and 18.00.

(b) All existing and new above ground flammable and combustible liquids tanks located inside of a structure shall be provided with an approved automatic-closing heat actuated valve on each withdrawal connection below the liquid level as required by the provisions of 527 CMR 4.00 and 9.00.

(c) The head of the fire department shall periodically inspect the existing above ground tank installations for safety, and if he determines that the installation or operation constitutes a hazard, he shall require unsafe tanks to be removed from service.

(d) Fuel oil tanks for supplying oil burning heating equipment and located above ground, inside or outside of the building, shall be installed in accordance with 527 CMR 4.00 and 9.00.

(e) When necessary for the safety of the general public, the head of the fire department may require greater separations or limit the storage capacity when the above ground tank installation is subject to severe exposure hazard or topographical conditions

(10) All tank vehicles used for the transportation of flammable or combustible liquids shall be

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designed, constructed, and operated in compliance with 527 CMR 8.00. No cargo tank, portable tank or transfer tank shall be parked overnight unless the land on which it is parked is licensed or permitted in accordance with 527 CMR 14.03(1).

(11) All Class I flammable liquids, all Class II, and Class IIIA combustible liquids and all flammable gases kept for sale at retail shall bear a label with the words "DANGER -- KEEP AWAY FROM FIRE" or similar wording. The lettering on the labels required by 527 CMR 14.03 shall be at least as conspicuous as boldface standard type, in capital letters not less than 14 point in size for containers over four ounces. Containers of four ounces or less may have lettering not less than six point in size.

(12) The storage of flammable gases shall comply with the following conditions:

- (a) Cylinders and pressure vessels shall be designed, constructed, tested and maintained in accordance with ANSI K61.1 and DOT 49 CFR.
- (b) Each cylinder, pressure vessel or group of containers shall be marked with the name of the gas contained in accordance with DOT 49 CFR.
- (c) Anhydrous ammonia shall be stored and handled in accordance with ANSI K61.1.
- (d) All flammable gases shall be kept in approved cylinders which shall be adequately capped or regulated and secured to prevent falling or being knocked over. Such cylinders, when stored outside of buildings, shall be kept in a dry location not less than 50' from any building and shall be protected against direct rays of the sun, accumulations of ice and snow, and access by unauthorized persons.
- (e) Gaseous hydrogen systems shall be installed and maintained in accordance with NFPA 50A.

(13) The storage of flammable solids shall comply with the recommended safeguards of the manufacturer and to the following standards as applicable:

- (a) Storage, Handling, and Processing of Magnesium - NFPA 480
- (b) Production, Processing, Handling and Storage of Titanium - NFPA 481
- (c) Production, Processing, Handling and Storage of Zirconium - NFPA 482
- (d) Manufacture of Aluminum and Magnesium Powder - NFPA 651
- (e) Metals and Alloys - Loss Prevention Data Sheet 7-85

(14) All tanks used for the keeping, storage or dispensing of flammable liquids shall be subject to the approval of the head of the fire department and meet the provisions of 527 CMR 9.00.

(15) The storage of flammable and combustible liquids, in approved glass containers, in approved drums or other approved metal containers not exceeding 60 gallons individual capacity, and in approved portable tanks not exceeding 793 gallons individual capacity shall comply with the requirements of NFPA 30-2000; Section 4.2 Design, Construction and Capacity of Containers; Table 4.2.3 Maximum Allowable Size-Container, Intermediate Bulk Container, and Portable tanks, and 527 CMR 14.03 (16-21)

(a) Exceptions:

- 1. Flammable or combustible liquids in the fuel tanks of motor vehicle, aircraft, motor boat or stationary engine.
- 2. Flammable or combustible liquids such as paint, oils, varnishes, or similar mixtures when stored for painting or maintenance or similar upon the premises and which are stored for a period not exceeding ten days.

(16) Interior storage rooms shall be enclosed by a fire resistance rated assembly and constructed in accordance with the requirements of 780 CMR.

(17) Flammable and combustible liquids, including stock for sale, shall not be stored so as limit use of the means of egress of the building.

(18) The storage of flammable or combustible liquids in containers or portable tanks shall comply with the following references based on applicability. Except that the head of the fire department may impose a quantity limitation or require greater protection, where in his determination, a potential hazard to life or property exists.

- (a) Assembly facilities classified in 780 CMR 302.1 as Group A-1 through A-4 shall

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comply with NFPA 30 Section 4.5.1 Requirements for Liquid Storage in Other Occupancies and NFPA 30 Section 4.5.4 Assembly Occupancies, Buildings Containing More than Three Dwelling Units, and Hotels.

- (b) Stadium and Amusement Assembly facilities classified in 780 CMR 302.1 as group A-5 shall comply with NFPA 30 Section 4.5.1 Requirements for Liquid Storage in Other Occupancies and NFPA 30 Section 4.5.4 Assembly Occupancies, Buildings Containing More than Three Dwelling Units, and Hotels.
- (c) Business, Educational, Institutional occupancies classified in 780 CMR 302.1 as groups B, E, Or I shall comply with NFPA 30 Section 4.5.5 Office, Educational, and Institutional Occupancies, and Day Care Centers
- (d) Industrial/Commercial facilities classified in 780 CMR 302.1 as Group H-2 and H-3 shall comply with the following sections in NFPA 30-2000:

Flammable storage utilizing hazardous material storage lockers: Section 4.6 Hazardous Materials Storage Lockers

Storage Cabinets: Section 4.3 Design, Construction, and Capacity of Storage Cabinets

Outside storage: Section 4.7 Outdoor Storage

Inside protected storage: Section 4.4 Design Construction, and Operation of Inside Liquid Storage Areas and Section 4.8 Automatic Fire Protection For Inside Storage

Inside unprotected storage: Section 4.4 Design Construction, and Operation of Inside Liquid Storage Areas and Section 4.4.4 Allowable Quantities and Storage Heights, subsections 4.4.4.1, 4.4.4.2., 4.4.4.3, 4.4.4.4, and Table 4.4.4.1 Indoor Unprotected Storage of Liquids in Containers, Portable Tanks, and Intermediate Bulk Containers

- (e) Mercantile occupancies classified in 780 CMR 302.1 as Group M, shall comply with NFPA 30, Section 4.5.6 Mercantile Occupancies.
 - (f) Dwellings, Residential, Hotel Buildings classified in 780 CMR 302.1 as group R-1 & R-2 shall comply with NFPA 30 Section 4.5.4 Assembly Occupancies, Buildings Containing More than Three Dwelling Units, and Hotels.
 - (g) Dwellings and Residential Buildings classified in 780 CMR 302.1 as Group R-2 & R-3 shall comply with NFPA 30 Section 4.5.3 Dwellings and Residential Buildings Containing Not More than Three Dwelling Units and Accompanying Attached and Detached Garages
 - (h) General purposes warehouse classified in 780 CMR 302.1 as group S-1 and S-2, shall comply with NFPA 30, Section 4.5.2 General-Purpose Warehouses
- (19) Storage in buildings of use group M (Mercantile) shall comply with the following provisions:
- (a) Non-flammable and non-combustible hazardous materials shall meet the following requirements: Oxidizers, Unstable Materials, Toxics, Highly Toxics, Corrosives, and Water.

Reactives shall be limited to:

$$Q = F \times A$$

where 'Q' is the maximum quantity in a single control area for mercantile display. 'F' is the

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density factor as indicated in Table 2. ‘A’ is the area occupied for mercantile display. For computation purposes, the area shall not exceed 1,500 square feet (139.39 m²) per control area.

Table 2. Density Factor for Hazardous Materials Exemption Calculation

| Material | Class | Solids Pounds ¹ (cubic feet) | Liquid gallons ¹ (pounds) | Gas ¹ (cubic fees) |
|------------------------|-------|--|---|-------------------------------|
| | | x 0.4536 for kg (x 28.32 for liters) | x 3.78 for liters (x 0.4536 for kg) | x 28.32 for liters |
| Oxidizers | 4 | Not permitted | Not permitted | Not permitted |
| | 3 | 0.75 | (0.75) | 112.5 |
| | 2 | 1.5 | (1.5) | 9 |
| | 1 | 12 | (12) | 4.5 |
| Unstable (reactive) | 4 | Not permitted | Not Permitted | Not Permitted |
| | 3 | 0.375 | (0.375) | 3.75 |
| | 2 | 0.2 | (0.3) | 1.5 |
| | 1 | Unlimited | Unlimited | 2.25 |
| Toxics | All | 0.65 | (0.65) | 1.053 |
| Corrosives | All | 6.5 | 0.65 | 1.053 |
| Highly Toxic | All | 0.0013 | (0.0013) | 0.026 |
| Water Reactive | 3 | 0.375 | (0.0375) | Not Applicable |
| | 2 | 0.3 | (0.3) | |
| | 1 | 0.375 | (0.375) | |

1. Quantities may be increased by 100% in sprinklered buildings.
- (20) Any facility that stores or manufactures aerosol products with a flammable propellant shall comply with the appropriate sections of NFPA 30B-1998.

14.04: Handling of Flammable Fluids

- (1) Bulk processing or industrial plants, refineries or other plants and distilleries and all buildings, tanks and equipment used for the storage, processing, distillation, refining or blending of flammable or combustible liquids shall be located, constructed and used in accordance with 527 CMR 9.00 and 18.00.
- (2) Class I flammable liquids shall not be dispensed by gravity from tanks, drums, barrels or similar containers. Approved pumps, taking suction from the top of the container shall be used except when the viscosity of the liquid makes such a restriction impractical. Class II, IIIA, and IIIB flammable or combustible liquids shall be drawn from tanks, drums or barrels by gravity through an approved self-closing valve or faucet which is affixed directly on the container or through a rigid closed piping system attached thereto.
- (3) Flammable liquids shall not be dispensed by a device that operates through pressure within a storage tank, drum or container, unless the tank, drum or container has been approved as a pressure vessel for the intended use. Air or oxygen shall not be used to pressurize the approved vessel.
- (4) Flammable liquids shall not be dispensed into a portable or stationary tank which does not meet the requirements of 527 CMR 9.00.
- (5) Fuel pumps and fuel dispensers shall be installed in accordance with 527 CMR 5.00.
- (6) Metal containers and portable metal tanks used for flammable and combustible liquids shall be electrically bonded or grounded during transfer of liquids in accordance with 527 CMR 12.00.

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(7) Flammable and combustible liquids used for the purpose of cleaning or degreasing shall comply with NFPA 34-2000.

(8) In locations where flammable vapors may be present, precautions shall be taken to prevent ignition by eliminating or controlling sources of ignition. Sources of ignition shall include open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, and mechanical), spontaneous ignition, physical chemical reactions, and radiant heat. The head of the fire department shall prohibit the use of devices or order the suspension of an operation when proper precautionary measures are not taken.

(9) Flammable and combustible liquid spills and leaks shall be promptly reported to the head of the fire department and to the Office of Incident Response of the Department of Environmental Protection.

(10) No person shall permit or cause to be permitted the discharge of flammable or combustible liquids or any waste liquid containing petroleum or its products into or upon any street, pavement, highway, drainage canal ditch, storm or sanitary drain or flood control channel, lake or waterway, or upon the ground. All waste petroleum products shall be stored in accordance with 527 CMR 9.00 and shall be disposed of in accordance with the regulations of the Massachusetts Department of Environmental Protection.

REGULATORY AUTHORITY

527 CMR 14.00: M.G.L. c. 148, §§ 9 and 10.

14.05: Handling of Flammable Gases

(1) Cylinders containing flammable gases shall be stored, handled and used in accordance with the requirements of the head of the fire department.

(2) Piping systems shall not be used to distribute flammable medical gases or other flammable gases in any hospital or similar facility.

14.06: Handling of Flammable Solids

(1) Flammable solids shall be handled and used in accordance with the standards referred to in 527 CMR 14.03(14), if applicable.

(2) When no nationally recognized standard has been promulgated for the handling and use of a particular flammable solid, that solid shall be handled and used in accordance with the recommendations of the manufacturer.

14.07: Fire Control

(1) Suitable fire control devices, such as small hose or portable fire extinguishers, shall be available at locations where flammable fluids are stored.

(2) At least one portable fire extinguisher having a rating of not less than 40-B:C shall be located outside of but not more than six feet from the door opening into any interior storage room.

(3) At least one portable fire extinguisher having a rating of not less than 20-B:C shall be located not less than ten feet nor more than 25' from any flammable fluid storage area located outside of an interior storage room but inside the building.

(4) Open flames and smoking shall not be permitted in flammable and combustible liquid storage areas and conspicuous "NO SMOKING" signs shall be posted.

(5) Materials which will react with water shall not be stored in the same room with flammable or combustible liquids.

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14.08: Referenced Publications

Documents or portions thereof that are referenced within 527 CMR 14.00 shall be considered a part of the requirements of 527 CMR 14.00. Refer to 527 CMR 49.00 for a complete listing of all documents referenced in 527 CMR.

REGULATORY AUTHORITY

527 CMR 14.00: M.G.L. c. 148, §§ 9 and 10.